

The Impact of Machine Translation on Language Teaching: A Systematic Review

Parisa Karimian

Linguistics Ph.D. Candidate, The Institute for Humanities and Cultural Studies

Pegah Zamani*

General Linguistics M.A., Ilam University

** Corresponding Author*

Abstract

In recent years, the advancement of machine translation technology has significantly influenced language teaching methods and practices. Machine translation refers to using computer software or systems to translate text or speech from one language to another. Machine translation has become increasingly prevalent in the language learning environment, offering new possibilities and challenges for educators and students. The widespread availability of machine translation tools and applications has raised questions about their influence on language teaching methodologies, pedagogical approaches, and language proficiency development. This systematic review aims to critically analyze the impact of machine translation on language teaching and learning outcomes. By synthesizing existing research and empirical evidence, this review seeks to provide insights into the effectiveness of machine translation in language education, as well as its potential implications for language instructors and learners. This review will examine the current state of research on the use of machine translation in language education, addressing both its benefits and limitations. Furthermore, it aims to contribute to our understanding of the impact of machine translation on language teaching. By exploring the various aspects of machine translation integration in language education, it also provides recommendations for language instructors, curriculum developers, and educational technologists. Ultimately, the goal is to inform and guide educational practices and policies related to the use of machine translation in language teaching and to stimulate further research in this evolving field.

Keywords: language learning, language teaching, machine learning, machine teaching, machine translation.

Introduction

The rapid advancement of technology has revolutionized various aspects of our daily lives, including the field of language learning and teaching. One of the most significant technological developments in this realm is the emergence of machine translation (MT), which has had a profound impact on the way language is taught and learned. This research paper aims to explore the effect of machine translation on language teaching, examining both the potential benefits and challenges it presents.

Machine translation, defined as the automated process of translating text from one language to another, has become increasingly accessible and accurate in recent years. With the advent of powerful language models and neural networks, MT systems have significantly improved their ability to capture the nuances and contextual meaning of language, making them a valuable tool for language learners and educators.

The integration of machine translation into language teaching has the potential to enhance the learning experience, provide personalized support, and facilitate cross-cultural communication. However, it also raises concerns about the potential impact on language proficiency, critical thinking skills, and the role of the teacher in the classroom. This research paper will delve into these various aspects, providing a comprehensive understanding of the implications of machine translation in language teaching.

Literature Review

Case (2015) examined the question of how language teachers in a highly technology-friendly university environment view machine translation and the implications that this has for the personal learning environments of students. In questionnaires and group discussions, respondents showed general agreement that although the use of machine translation by students could be considered cheating, students are bound to use it anyway, and suggested that teachers focus on the kinds of skills students would need when using machine translation and design assignments and exams to practice and assess these skills [1].

Olkhovska and Frolova (2020) explored the impact of using machine translation engines on the performance of translation students. Their results showed that the quality of the text translated by the students who received no previous training in post-editing with the use of a modern machine translation engine was of poorer quality compared to the translation of the same text made by the students without the use of a machine translation engine. The students using the machine translation engine showed the tendency not to treat critically the output of the machine translation engine, thus scoring more penal points than the students translating on their own. The evidence from their study implied the necessity of teaching students to use machine translation in their work and to post-edit texts by means of developing the appropriate cross-curricular methodology of teaching [2].

Omar and Gomaa (2020) evaluated the usefulness of applying machine translation systems to literature with the purpose of identifying the challenges that may have negative impacts on the reliability of machine translation systems. Results indicated that different lexical, structural, and pragmatic errors are encountered by users which negatively impact the reliability of these translations. Educators and translation instructors need to reflect on the challenges of machine translation systems in literature. Software developers need also to address the problems faced by users and students in the translation from and into the Arabic language [3].

Benites and Lehr (2021) discussed the latest version of the widely-used Common European Framework of Reference (CEFR) in light of the recent rise of NMT. They showed how the usefulness and applicability of some of the CEFR descriptors are being called into question by technological developments. According to their findings, while the more advanced levels encompass tasks that cannot be performed by a machine alone, many of the tasks in the early levels (up to B2) could be done today by or with the help of NMT. This shows the need for a new definition of these language proficiency levels, which should take the recent advances in language technology, especially NMT, into account. As of today, the adequacy of the level descriptors for in-class activities (reading, writing, translation for learning purposes) as well as, real-life situations is no longer guaranteed, and this can lead to serious difficulties regarding assessment and curricular development [4].

Borodina et al. (2021) conducted an experiment to determine the impact of using a machine translation system on the quality of teaching students to translate texts in terms of the number of errors and the correctness of the industry terminology conveyed. They concluded that the use of the machine translation system has a significant positive impact on the quality of training in the translation of professional texts, both in terms of the number of errors and in terms of the conveyance of the key terminology of the original text [5].

the cognitive processes necessary for language acquisition, such as actively translating, paraphrasing, and analyzing the target language [12].

Furthermore, the accuracy and reliability of machine translation systems have been a subject of ongoing debate. While modern MT technologies have significantly improved, they still struggle to capture the nuances and contextual meaning of language, particularly in complex or idiomatic expressions [12]. This can lead to inaccurate or misleading translations, which may hinder language learning and undermine the development of critical thinking skills.

The role of the teacher in language teaching is also a crucial consideration in the context of machine translation. Some scholars argue that the integration of MT may lead to a diminished role for teachers, as learners become more self-reliant in their language learning [11]. However, others suggest that the use of machine translation can actually enhance the teacher's role, providing opportunities for more personalized instruction, targeted feedback, and the development of higher-order language skills [12].

Overall, the existing literature suggests that the impact of machine translation on language teaching is a complex and multifaceted issue, with both potential benefits and challenges that need to be carefully considered and addressed.

Materials and Methods

This research paper employs a systematic review approach to examine the existing literature on the impact of machine translation on language teaching. The systematic review methodology involves a comprehensive and rigorous search of relevant academic databases, followed by a critical analysis and synthesis of the findings from the selected studies. The search strategy for this review involved querying various academic databases, including ERIC (Education Resources Information Center), Google Scholar, and Web of Science, using a combination of keywords such as "machine translation", "language teaching", "language learning", and "computer-assisted language learning". The search was limited to peer-reviewed journal articles, conference proceedings, and book chapters published in the last 10 years, ensuring the inclusion of the most recent and relevant research on the topic.

The screening and selection process involved several stages. First, the titles and abstracts of the identified articles were reviewed to determine their relevance to the research question. Articles that did not meet the inclusion criteria, such as those not focused on the impact of machine translation on language teaching, were excluded. Second, the full-text articles were reviewed, and further screening was conducted to ensure the selected studies provided a comprehensive understanding of the research topic.

The selected studies were then critically analyzed, and the key findings were synthesized to identify the potential benefits, challenges, and implications of incorporating machine translation into language teaching. The analysis also considered the methodological approaches, limitations, and future research directions reported in the reviewed studies. The findings from the systematic review are presented in a narrative format, organized thematically to address the research question. The discussion section provides a critical evaluation of the existing literature, highlighting the strengths, limitations, and areas for further investigation.

Findings

The systematic review of the literature on the impact of machine translation on language teaching reveals a complex and multifaceted landscape, with both potential benefits and challenges.

4-1- Potential Benefits of Machine Translation in Language Teaching

4-1-1- Improved Comprehension and Access to Learning Resources

One of the primary benefits of incorporating machine translation into language teaching is its ability to enhance learners' comprehension of course materials and facilitate access to a wider range of learning resources. Several studies have found that MT can help students overcome language barriers, particularly for beginner or intermediate learners, by providing real-time translation assistance (Niño, 2009; Groves & Mundt, 2015). This can lead to increased understanding of course content, improved engagement with learning materials, and better overall academic performance.

Furthermore, machine translation can enhance the accessibility of language learning resources, allowing students to access a diverse range of materials in their native or preferred language (Niño, 2009). This is especially beneficial for learners studying less commonly taught languages or those with diverse linguistic backgrounds, where the availability of learning resources may be limited.

4-1-2- Personalized Learning and Feedback

Another potential benefit of machine translation in language teaching is the opportunity for personalized learning and feedback. MT systems can provide individualized translation assistance, grammar corrections, and feedback on language usage, enabling learners to identify and address their specific areas of weakness (Groves & Mundt, 2015). This personalized approach can foster a more engaging and effective learning experience, catering to the unique needs and proficiency levels of each student. By offering tailored support and feedback, machine translation can help learners develop their language skills more efficiently and effectively, ultimately enhancing their overall language proficiency.

4-2- Challenges and Limitations of Machine Translation in Language Teaching

4-2-1- Potential Decline in Language Proficiency

One of the primary concerns regarding the use of machine translation in language teaching is the potential for a decline in language proficiency. Some researchers argue that over-reliance on MT can lead to learners becoming overly dependent on the technology, failing to develop their own language skills and cognitive processes necessary for language acquisition (Niño, 2009).

When students rely too heavily on machine translation, they may miss opportunities to actively engage with the target language, such as translating, paraphrasing, and analyzing language structures. This can hinder the development of essential language skills, such as vocabulary, grammar, and communication strategies (Groves & Mundt, 2015).

4-2-2- Accuracy and Reliability Concerns

The accuracy and reliability of machine translation systems have been a subject of ongoing debate. While modern MT technologies have significantly improved, they still struggle to capture the nuances and contextual meaning of language, particularly in complex or idiomatic expressions (Groves & Mundt, 2015). Inaccurate or misleading translations can lead to confusion, misunderstandings, and the reinforcement of incorrect language usage, which may ultimately undermine the language learning process.

4-2-3-Diminished Role of the Teacher

The integration of machine translation into language teaching has also raised concerns about the potential diminishment of the teacher's role. Some scholars argue that the increased reliance on MT may lead to a reduced need for teacher intervention, as learners become more self-reliant in their language learning (Niño, 2009).

However, other researchers suggest that the use of machine translation can actually enhance the teacher's role, providing opportunities for more personalized instruction, targeted feedback, and the development of higher-order language skills (Groves & Mundt, 2015). Teachers can leverage MT as a tool to support and supplement their teaching, rather than replacing their expertise and guidance.

Results Discussion

The findings from the systematic review highlight the complex and multifaceted nature of the impact of machine translation on language teaching. While the integration of MT into language learning has the potential to offer significant benefits, it also presents various challenges and limitations that must be carefully considered.

One of the primary advantages of machine translation in language teaching is its ability to enhance learners' comprehension of course materials and facilitate access to a wider range of learning resources. By providing real-time translation assistance, MT can help students overcome language barriers and engage more effectively with course content, particularly for beginner or intermediate learners. Additionally, the increased accessibility of learning resources in diverse languages can benefit students with diverse linguistic backgrounds or those studying less commonly taught languages.

However, the potential decline in language proficiency is a significant concern raised in the literature. Over-reliance on machine translation may lead to learners becoming overly dependent on the technology, failing to develop their own language skills and cognitive processes necessary for language acquisition. This can hinder the development of essential language skills, such as vocabulary, grammar, and communication strategies.

The accuracy and reliability of machine translation systems also pose challenges in the context of language teaching. While modern MT technologies have improved, they still struggle to capture the nuances and contextual meaning of language, particularly in complex or idiomatic expressions. Inaccurate or misleading translations can lead to confusion, misunderstandings, and the reinforcement of incorrect language usage, which may undermine the language learning process.

The potential diminishment of the teacher's role in language teaching is another concern that emerged from the review. While some scholars argue that the increased reliance on MT may lead to a reduced need for teacher intervention, others suggest that the use of machine translation can actually enhance the teacher's role, providing opportunities for more personalized instruction, targeted feedback, and the development of higher-order language skills.

To address these challenges and leverage the potential benefits of machine translation in language teaching, a balanced and strategic approach is necessary. Educators should consider integrating MT as a supplementary tool, rather than a replacement for traditional language teaching methods. This can involve using MT to provide translation assistance and access to learning resources, while still emphasizing the importance of active engagement with the target language, critical thinking, and the development of language proficiency.

Furthermore, educators should provide explicit guidance and instruction on the appropriate use of machine translation, helping learners develop a critical understanding of its limitations and the importance of developing their own language skills. This may involve teaching strategies for cross-checking MT outputs, identifying and correcting errors, and engaging in more active language learning activities.

Additionally, further research is needed to explore the long-term effects of machine translation on language learning outcomes, the optimal integration of MT into language teaching curricula, and the role of the teacher in this evolving landscape. Longitudinal studies and empirical investigations can provide valuable insights to inform best practices and guide the effective implementation of machine translation in language education.

Conclusion

The integration of machine translation into language teaching is a complex and multifaceted issue, with both potential benefits and challenges that must be carefully considered. On the one hand, MT can enhance learners' comprehension of course materials, facilitate access to a wider range of learning resources, and provide personalized learning and feedback. On the other hand, concerns have been raised about the potential decline in language proficiency, the accuracy and reliability of MT systems, and the potential diminishment of the teacher's role in the language learning process.

To effectively leverage the benefits of machine translation while mitigating the challenges, a balanced and strategic approach is necessary. Educators should consider integrating MT as a supplementary tool, providing guidance and instruction on its appropriate use, and emphasizing the importance of active engagement with the target language, critical thinking, and the development of language proficiency.

Ongoing research and empirical investigations are crucial to further understanding the long-term effects of machine translation on language learning outcomes and informing best practices for its integration into language teaching curricula. By navigating this complex landscape, educators can harness the potential of machine translation to enhance language learning and teaching, while ensuring the development of essential language skills and critical thinking abilities.

References

- [1] Case, M. (2015). Machine Translation and the Disruption of Foreign Language Learning Activities. *eLearning Papers*, 45: 4-16.
- [2] Olkhovska, A. & Frolova, I. (2020). Using Machine Translation Engines in the Classroom: a Survey of Translation Students' Performance. *Advanced Education*, 15: 47-55.
- [3] Omar, A. & Gomaa, Y. (2020). The Machine Translation of Literature: Implications for Translation Pedagogy. *International Journal of Emerging Technologies in Learning (iJET)*, 15(11): 228-235. Kassel, Germany: International Journal of Emerging Technology in Learning. Retrieved May 4, 2024 from <https://www.learntechlib.org/p/217120/>
- [4] Benites, A. D. & Lehr, C. (2021). Neural machine translation and language teaching – possible implications for the CEFR. *Bulletin suisse de linguistique appliquée*, 114: 47-66.
- [5] Borodina, M., Golubeva, T. I., Korotaeva, I. E., Shumakova, S. Y., Bessonova, T. V., and Zharov, A. N. (2021). Impact of the Google Translate Machine Translation System on the Quality of Training Student Translators. *Webology*, 18: 68-78.
- [6] Deng, X. & Yu, Z. (2022). A Systematic Review of Machine-Translation-Assisted Language Learning for Sustainable Education. *Sustainability*, 14 (7598).
- [7] Klekovkina, V. & Denie-Higney, L. (2022). Machine Translation: Friend or Foe in the Language Classroom? *L2 Journal*, 14: 105-135.
- [8] Lee, S.M. (2022). An investigation of machine translation output quality and the influencing factors of source texts. *ReCALL*, 34(1): 81-94.
- [9] Urlaub, P. & Dessein, E. (2022). Machine Translation and Foreign Language Education. *Frontiers in Artificial Intelligence*: 1-5.
- [10] Lee, S. M. (2023). The effectiveness of machine translation in foreign language education: a systematic review and meta-analysis. *Computer Assisted Language Learning*, 36(1-2): 103-125. <https://doi.org/10.1080/09588221.2021.1901745>
- [11] Niño, A. (2009). Machine translation in foreign language learning: Language learners' and tutors' perceptions of its advantages and disadvantages. *ReCALL*, 21(2): 241-258. <https://doi.org/10.1017/S0958344009000172>
- [12] Groves, M., & Mundt, K. (2015). Friend or foe? Google Translate in language for academic purposes. *English for Specific Purposes*, 40: 112-121. <https://doi.org/10.1016/j.esp.2015.04.001>